

THE PHILOSOPHY OF DATA LITERACY – AN ANALYSIS AMONG HIGHER EDUCATION LEARNERS

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ABSTRACT

The basis for each educational research is scientific method. Scientific method uses directed question and manipulation of facts to methodically observed information about teaching-learning experiences. In Kerala, we have 100% literacy, but most of the people who are educated also lack data literacy, digital literacy and information literacy. The emergence of internet as a global force in early 2000 prompted a variety of efforts to define literacy. In the world of computer and technology, we must have the capability to operate and understand data by using computers. Data literacy is the ability to comprehend, create and communicate data and is the first level of tri = level literacy, fluency and mastery skills. We all know that education is the investment for future society, but we must be educated in future literacy of technology. Studying about data literacy among young post-graduate students is very significant towards progress of respective subjects of society. Data literacy plays a key role in developing knowledge of subjects, including science, arts, commerce and language. The aim of the study is to measure the level of data literacy by using data literacy test on a sample of 600 students. The result shows that data literacy is average among future learners.

KEYWORDS: Data literacy, Data Manipulation & Post-graduate Students

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INTRODUCTION

In the present scenario, the development of society depends upon the quality of research and development in any area. Also, phenomenon and evaluation are often related and represents as data. Thus manipulating and interpreting data from the view of research, which is highly relevant in modern society. We are bounded by data. When you open the newspaper and see a graph or a table as a part of an editorial, what you are looking at is data. When you listen to news on the television or radio, what you are hearing are conclusions drawn from data someone else has collected. Data are better than others because the data has been collected analyzed, or concluded more effectively`. So, knowledge of data interpretation helps anyone to succeed in their field effectively.

NEED OF THE STUDY

Data Literacy is the ability to comprehend, create and communicate data and is the first level of tri-level literacy, fluency and mastery of skills (Micheal and Anthony, 2014). Data literate people have the knowledge, understanding and skills to connect people to data. It is an essential ability required in the global knowledge-based economy; the manipulation of data occurs in daily processes across all sectors and discipline. An understanding of how decisions are informed by data, and how to collect, evaluate and apply this data in support of evidence-based decision making will increasingly be required in knowledge economy jobs, as data literacy spans both qualitative and quantitative data and is enabled by a broad range of data-related capabilities and

learning outcomes. Even in everyday life, data collection can be important. We can see that bakers often keep dairies when they are re-learning how to bake a new type of biscuit. Farmers keep a log about the growth of their gardens and birdwatchers keep track of the types of birds and their whereabouts. Drivers keep track of vehicle messages and homeowners keep track of their monthly electrical bills.

Most people possess high qualifications, but they do not have enough ability to deal with more data. So, it hinders them to interpret and communicate using large number of data in various situations and opportunities. Post-graduate students are mature learners and they have to use this component frequently in the learning situations.

THEORETICAL VIEWS

According to Michael Bowen and Anthony Bartley (2014) “data literacy is important for your students because data are used to argue and persuade people to, among other things, vote for political agendas or lease a car. An improved understanding of data practices means that better questions can be asked.”

In the words of American library association, they identified six significant themes to consider about data literacy, which is listed as follows:

Statistical Literacy

Students must critically “read,” contextualize and interpret raw and synthesized data. Discerning correlation from causation; recognizing the difference in the meaning of mean, median and mode; understanding what margin of error signifies in polling data; and recognizing potential biases in collected data, among other skills, are critical for reading scholarly research, understanding arguments in popular media and interpreting government documents.

For example, statistics flood news articles, Facebook feeds and scholarly journals, etc.

Data Visualization

Having skills to create and comprehend mapped data, graphs, pie charts and emerging forms of visualizations will help students effectively navigate visually rich information sets.

Data Argument

Our students can assemble random bits of factual data. However, it takes far more skill to understand how data is used — both informational and persuasively — to support arguments in the resources examined by students, and then for students to create viable arguments themselves. These arguments could take the form of statistics embedded as evidence in a research paper, shared charts and graphs with tweaked or non-standardized elements, advertising, or infographics.

Big Data and Citizen Science

More and more data is being collected, often without citizens’ knowledge, via frequent shopper cards, step counters, social media and more. Some data is life-saving, such as DIY systems that help parents monitor their children’s type 1 diabetes by transferring insulin data temporarily and anonymously online. Careful human interpretation of big data is required for positive outcomes to be achieved.

Personal Data Management

It is a result of Google’s personalized search output of Facebook’s custom ads, students have daily experience, captured as

their clicks and likes are converted into actionable data. While students might like seeing relevant ads or music recommendations that match their favorites, few know it is because of the breadcrumb trail they leave behind. Students may think the website CNN.com is serving up the news to them, but they are usually unaware that as many as 14 bots are following their actions and converting their clicks into data.

Ethical Data Use

Data is not inherently good or bad, but it can be framed, edited manipulated, or otherwise modified for unethical purposes.

Through these reviews, it is understood that data literacy is an ability to deal with many items/concepts.

OBJECTIVE OF THE STUDY

To test whether there exists any significant difference in the level of data literacy among students in post graduate level in the following sub samples:

- Type of management of the college
- Gender

HYPOTHESIS OF THE STUDY

There will be significant difference in the level of data literacy among post graduate students on the basis of subsamples selected.

METHODOLOGY

A survey technique was adopted for the study.

Sample

For the present study, 600 postgraduate students of arts and science college, from Calicut district were selected as sample. The due representation was given to gender, subjects of specialization, locale of the college and type of management of schools.

Tool

Data literacy test which consists of test items prepared in accordance with five components of data literacy. This test consists of series of 50 items. Each question has four choices as options. The reliability of the tool observed with Cronbach's alpha. The value of Cronbach's alpha is .745. To ensure the validity of the tool, face validity is adopted. Investigators consulted experts in the area during the development of the tool, and the tool was given to the experts for approval of items for testing data literacy, thus it ensured the face validity.

ANALYSIS AND DISCUSSION

The important statistical properties of the scores on the variable data literacy were analyzed as a preliminary step. The mean, median mode, standard deviation, skewness and kurtosis were calculated for total sample, as in table 1.

Table 1: Mean, Median, Mode and Standard Deviation Skewness and Kurtosis for Total Sample

Variable	N	Mean	Median	Mode	Standard Deviation	Skewness	Kurtosis
Date	600	23.76	24.00	25.00	6.31	-.167	-.442

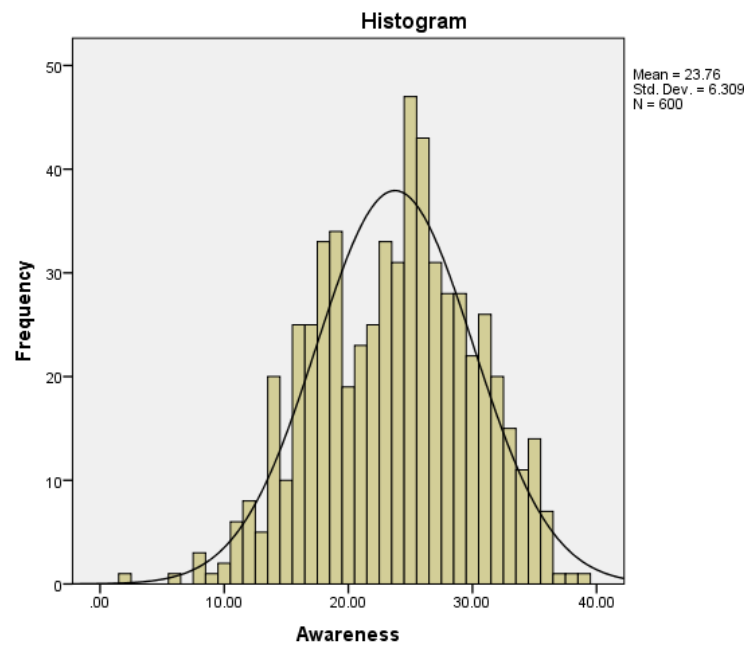


Figure 1: Histogram for Preliminary Analysis.

Discussion of the Result

Table 1 illustrates that the values of mean, median and mode of variable data literacy for total sample are 23.76, 36 and 37, respectively. These values are almost equal, which shows the possibility of the variable to follow normal distribution. The obtained value of skewness is .166, which means the distribution is negatively skewed. The value of kurtosis is -.442, which suggests that the above distribution is leptokurtic. The distribution of the variable data literacy is approximately normal.

Major Analysis

The extent of data literacy among postgraduate students for the relevant subsamples based on gender.

Table 2: Mean and Percentage Score of Data Literacy Test of Male and Female Postgraduate Students based on Gender

Mean Score		Percentiles	Score	
Male	Female		Male	Female
21.55	24.11	P ₁₀	13.5	16
		P ₂₀	17	18
		P ₃₀	18	21
		P ₄₀	19	23
		P ₅₀	21	24.5
		P ₆₀	24	26
		P ₇₀	25.50	27
		P ₈₀	28	32
		P ₉₀	29.5	32

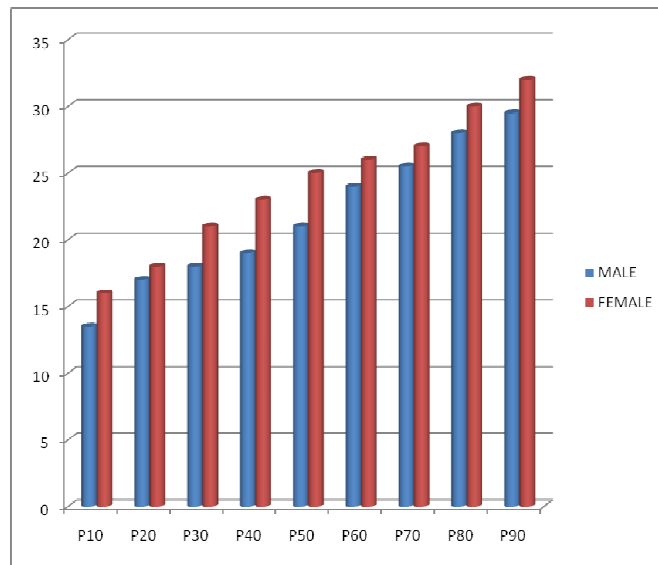


Figure 2: Graphical Representation of Data Literacy among Postgraduate Students for the Relevant Subsample based on Gender.

Discussion of the Result

The mean score of data literacy among male and female postgraduate students are 21.55 and 24.11, respectively. Table 2 also reveals percentile scores for data literacy among male and female postgraduate students. The 10th percentile obtained for male and female postgraduate students are 13.5 and 16, respectively. This means 10% of male and female postgraduate students come below the score 13.5 and 16, respectively and 90% come above that score.

Extent of data literacy among post-graduate students for the relevant subsamples based on the type of management.

Table 3: Mean and Percentile Score of Data Literacy Test among Postgraduate Students are based on the Types of Management

Mean Score			Percentiles	Score		
Government	Aided	Unaided		Government	Aided	Unaided
24.39	24.54	21.37	P ₁₀	16	16	14
			P ₂₀	18	19	16
			P ₃₀	20	22	18
			P ₄₀	22	24	19
			P ₅₀	25	25	19
			P ₆₀	28	20	23
			P ₇₀	29	28	25
			P ₈₀	30	30	26
			P ₉₀	32	33	28

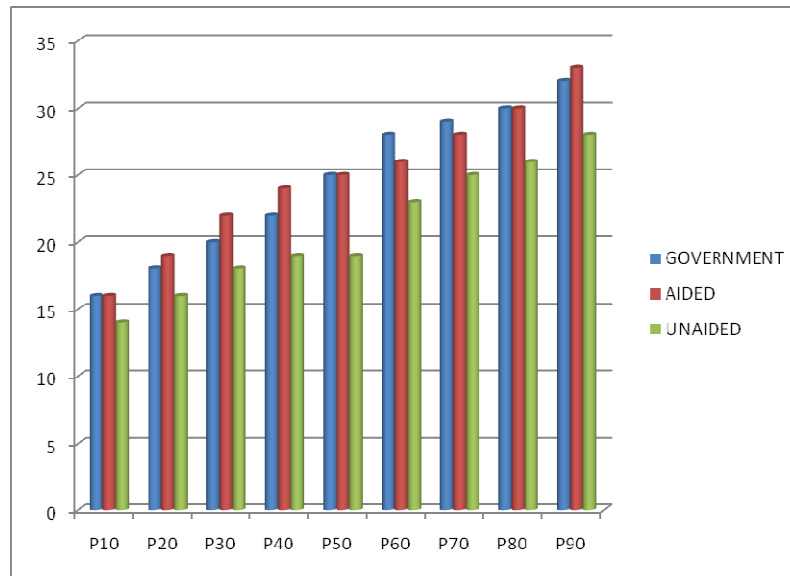


Figure 3: Graphical Representation of Data Literacy among Postgraduate Students for the Relevant Subsamples based on Types of Management.

DISCUSSIONS OF THE RESULT

Mean scores of data literacy among postgraduate students based on the type of management, viz., government, aided and unaided are 24.39, 24.54 and 21.37 are there for data literacy, based on the type of management but are not satisfactory to a certain extent.

It is evident from table 3, the 90th percentile of the score of the data literacy test for government aided, unaided and post-graduate students are 32, 33 and 28, respectively. This means only 10% of government aided and unaided post-graduate students come above the score of 32, 33, 28 and 90% respectively, come below that score.

FINDINGS

- The mean score obtained for the data literacy test is less than the neutral value, which means that the extent of data literacy among post-graduates are not satisfactory to a certain extent.
- Based on the type of college management, post-graduate students differ significantly ($F:13.990$) for (2,597) degrees of freedom at 0.01 level of significance. This shows that data literacy differ significantly among post-graduate students from government aided and unaided colleges.
- Based on gender data, literacy among post-graduate students differ significantly ($t: 3.47$). It implies that there is a significant difference between male and female post-graduate students in their data literacy score.

CONCLUSIONS

The extent of data literacy among post-graduate students are not satisfactory to certain extent. Based on gender, data literacy among post-graduate students differs significantly. Female post-graduate students have more data literacy than males in post-graduate students. Regarding government, aided and unaided colleges, data literacy differ significantly among post-graduate students.

EDUCATIONAL IMPLICATION

- The outcome of analysis reveals that data literacy among post-graduate students is satisfactory to a certain extent. Hence, importance should be given to include the concept of data literacy in the curriculum for upgrading data literacy capacity of college students.
- Female students possess more data literacy than boys, so the environment should change, among boys for improving data literacy level
- Include content, problems and situation relating to the data calculation in the curriculum
- Conduct different training programs to create awareness about data analysis method.

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